

Build - up Exercise 7A



Fundamental Question

1. Complete the following table.

Power	Algebraic expression	Meaning
6 to the power 3		
	4^2	
		$8 \times 8 \times 8 \times 8$
a to the power 5		
	b^3	
		$c \times c$

2. Simplify the following expressions.

(a) $a^2 \times a^4$

(b) $a^5 \times a^3$

(c) $2a \times a^6$

3. Simplify the following expressions.

(a) $(6b^2)(3b)$

(b) $(5b^2)(2b^6)$

(c) $(4b^4)(-7b^3)$



Consolidation Question

4. Simplify the following expressions.

(a) $(2c^2)(3c)(c^2)$

(b) $(2c)(3c^2)(4c^3)$

(c) $(-8c^7)(5c^4)(3c^2)$

5. Simplify the following expressions.

(a) $d^3 \times d^2e^3$

(b) $-e^3 \times de^2$

(c) $d^6e^5 \times d^2$

6. Simplify the following expressions.

(a) $5m^4(m^2n^7)$

(b) $n^5(-3m^3n^2)$

(c) $(-2mn^2)(-7m^3)$

7. Simplify the following expressions.

(a) $(xy)(x^2y^3)$

(b) $(x^2y)(3xy)$

(c) $(5x^3y^2)(2x^2y^3)$

8. Simplify the following expressions.

(a) $-pq^2 \times p^3q^3$

(b) $-2p^3q \times p^2q^3$

(c) $4pq^5 \times (-6p^4q)$



Challenging Question

9. Find the result of $-2m^6n^5$ times $11mn$.

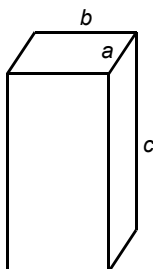
10. (a) If $2a^3 \times a^m = 2a^5$ where m is a positive integer, find the value of m .

(b) If $x^2y^r \times 3x^s y = 3x^3y^4$, where r and s are positive integers, find the values of r and s .

11. The volume V of a cuboid is given by the following formula:

$$V = abc$$

If $a = 2x^3$, $b = 2a$, $c = 2b$, find the volume of the cuboid in terms of x .



Build - up Exercise 7B

Fundamental Question

12. Simplify the following expressions.

(a) $(x \times x)^3$

(b) $-(y \times y \times y)^2$

(c) $(-z \times z \times z \times z)^7$

13. Simplify the following expressions.

(a) $(-x^2)^4$

(b) $(y^4)^2$

(c) $(2z^5)^3$

Consolidation Question

14. Simplify the following expressions.

(a) $(\frac{1}{2}a^3)^2$

(b) $(\frac{2}{3}a^4)^3$

(c) $(-\frac{3}{4}a^5)^3$

15. Simplify the following expressions.

(a) $(2ab^2)^2$

(b) $(-3a^2b^3)^3$

(c) $-(a^3b^4)^2$

16. Simplify the following expressions.

(a) $(a^2b^3)^4(ab)^2$

(b) $(2a^3b)(-2^2a^2b)^2$

(c) $(-2ab^2)^2(-3^2a^2b)^2$

17. Simplify the following expressions.

(a) $(-xy)(-xy)(-xy)(-xy)(-xy)$

(b) $(xy^2)(xy^2)(xy^2)^2$

(c) $(x^3y)^2(x^3y)(x^3y)^3(x^3y)$

**Challenging Question**

18. It is given that $b^a = 4$, where a is a positive integer. Find the value of b^{3a} .
19. (a) If $(x \times x^n)^3 = x^{18}$ where n is a positive integer, find the value of n .
(b) If $(xy^2 \times x^n y^2)^3 = x^{18} y^{4m}$ where m and n are positive integers, find the values of m and n .

Build - up Exercise 7C

Fundamental Question

20. Simplify the following expressions.

(a) $d^4 \div d$

(b) $d^{10} \div d^3$

(c) $2d^4 \div d^3$

21. Simplify the following expressions.

(a) $-27c^3 \div 3c$

(b) $-8c^4 \div (-4c^2)$

(c) $-c^9 \div 2c^6$

Consolidation Question

22. Simplify the following expressions.

(a) $-6m^3 \div 18m^9$

(b) $9m^2 \div (-27m^3)$

(c) $-8m^3 \div (-16m^4)$

23. Simplify the following expressions.

(a) $\frac{x^3y^4}{xy}$

(b) $\frac{25x^6y^2}{5x^4y}$

(c) $\frac{-10x^6y^3}{5xy^2}$

24. Simplify the following expressions.

(a) $\frac{x^4y^3}{x^7y^2}$

(b) $\frac{100x^6y^6}{25x^4y^7}$

(c) $\frac{-30x^3y^2}{-8x^5y^4}$

25. Simplify the following expressions.

(a) $\frac{(a^2b^3)^2}{a^3b}$

(b) $\frac{(3a^4b^2)^2}{3a^3b^4}$

(c) $\frac{(-4a^2b)^2}{(2ab)^3}$



Challenging Question

26. If $(ab)^7(a^m b) \div (ab^n)^2 = a^7 b^2$ where m and n are positive integers, find the values of m and n .

27. Given that $a = \frac{1}{3}$ and $b = 72$, find the values of the following.

(a) $a^3 b^{21} \div ab^{20}$

(b) $\frac{(ab^{15})^2(a^2 b^{23})}{ab^{51}}$

Build - up Exercise 7D



Fundamental Question

28. Complete the following table.

Polynomial	Coefficient of x	Coefficient of y	Constant term
$4x + 2y + 1$			
$3x + y + 2$			
$5x - 3y - 3$			
$2x + 4$			
$3y - 5$			

29. Complete the following table.

Polynomial	Number of terms	Degree of polynomial	Coefficient				Constant term
			x	x^2	x^3	xy	
$2x^3 + 3x^2 + 4x + 2xy + 5$							
$3x^3 + 4x^2 + 5x - 6$							
$-5xy + x^2 + 7$							
$x^3 + 3x^2 + 5xy - \frac{1}{2}$							
$\frac{1}{2}x^2 - \frac{1}{3}x^3 + 4xy$							



Consolidation Question

30. Simplify the following expressions.

(a) $2x + x$

(b) $6x - 3x$

(c) $3x - 2x - 5x$

31. Simplify the following expressions.

(a) $6x + 2y - 4x + 3y$

(b) $3 + 4x + 5x + 3$

(c) $4a^2 - 6b - 7b + 8a^2 + 5b$

32. Simplify the following expressions.

(a) $2ab + 3ac - 4ab + 6ac$

(b) $9ab^2 - (-7a^2b) - 8ab^2 - 6a^2b - 7a^2b$

(c) $2xy - 4xy^2 + 5x^2y + 6xy^2 - 7x^2y - 2xy$

33. Arrange each of the following polynomials in ascending and descending powers of x respectively.

(a) $-4x + 3 + 5x^2$

(b) $20x + 3x^2 - 9$

(c) $8x + 6x^2 - 2x^3 + 13$



Challenging Question

34. The sum of the first n integers, $1 + 2 + 3 + \cdots + n$, can be obtained by using the following polynomial,

$$\frac{1}{2}n^2 + \frac{1}{2}n$$

(a) How many terms are there in the polynomial?

(b) What is the degree of the polynomial?

(c) Find the value of $1 + 2 + 3 + \cdots + 16$.



Build - up Exercise 7E



Fundamental Question

35. Simplify the following expressions.

$$\begin{array}{r} \text{(a)} \quad x+1 \\ +) \quad 2x+1 \\ \hline \end{array}$$

$$\begin{array}{r} \text{(b)} \quad 3-5y \\ +) \quad 7-2y \\ \hline \end{array}$$

$$\begin{array}{r} \text{(c)} \quad 4x+5y \\ +) \quad 2x-3y \\ \hline \end{array}$$

$$\begin{array}{r} \text{(d)} \quad 5x-6y \\ +) \quad 8x+4y \\ \hline \end{array}$$

36. Simplify the following expressions.

$$\begin{array}{r} \text{(a)} \quad 4x+2 \\ -) \quad 3x+1 \\ \hline \end{array}$$

$$\begin{array}{r} \text{(b)} \quad 8p+1 \\ -) \quad -5p-3 \\ \hline \end{array}$$

$$\begin{array}{r} \text{(c)} \quad 5x-4y \\ -) \quad 3x-9y \\ \hline \end{array}$$

$$\begin{array}{r} \text{(d)} \quad 5x+3y \\ -) \quad 2x-2y \\ \hline \end{array}$$

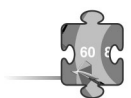
37. Simplify the following expressions.

$$\begin{array}{r} \text{(a)} \quad 5x-6y+7 \\ +) \quad 2x+4y-3 \\ \hline \end{array}$$

$$\begin{array}{r} \text{(b)} \quad 4x-5y-6xy \\ +) \quad 3y-2xy \\ \hline \end{array}$$

$$\begin{array}{r} \text{(c)} \quad 3x-2y+4 \\ -) \quad 2x+y+1 \\ \hline \end{array}$$

$$\begin{array}{r} \text{(d)} \quad 5p-4q+3z \\ -) \quad 3p \quad +3z \\ \hline \end{array}$$



Consolidation Question

38. Simplify the following expressions.

(a) $(2x - 3y + 3) + (3x - y)$

(c) $(4y + 5) - (5x - 2y + 4)$

(b) $(x + 2) + (x + y + 5)$

(d) $(3p - 4q + 5) - (-q - 1)$

39. Simplify the following expressions.

(a) $(y^2 - 8y + 9) + (y^2 + 4y - 5)$

(c) $(6p^2 + 4p - 9) - (5p^2 + 4p - 8)$

(b) $(2 + 4x - x^2) + (13 - x + 3x^2)$

(d) $(1 - 7q + 5q^2) - (2 + q + 3q^2)$

40. Simplify the following expressions.

(a) $(5 + x^2 - 3x) + (x + 2)$

(c) $(5x + 10x^2 - 8) + (5x^2 + 2 - 4x)$

(b) $(3a + a^2) - (-2a^2 + 5 + a)$

(d) $(-2a^2 + 10 + a) - (-3 - a^2 - 2a)$

41. Simplify the following expressions.

(a) $(7p^2 - 3pq - 2q^2) + (p^2 + q^2)$

(c) $(2p^2q + 5qp - 12) - (9 + 6pq + 4p^2q - p^2)$

(b) $(8pq - 4p^3 + 6p^2) + (5p^3 - 6p^2 + 8pq)$

(d) $(3pqr + 6p^3q + 3q) - (2qp^3 - 5rqp)$

42. Simplify the following expressions.

(a) $(r^2 - 7 - 6r) - (5r + 4r^2 - 9) + (-4r + 3r^2)$

(b) $(8 + 5r^2 + 3r) - (r - 3r^2) - (-9r^2 - 3r + 4)$





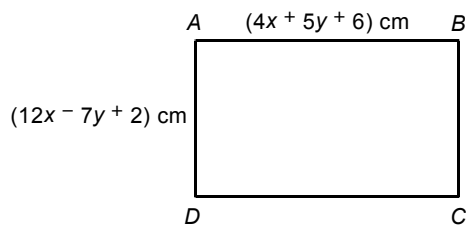
Challenging Question

43. Charles got $(3x - 4y + 1)$ marks in the first Chinese Language test. In the second Chinese Language test, he got $(-2x + 7y + 8)$ marks more than the first one. What was the score of Charles in the second Chinese Language test?
44. The following shows the sales of tickets of the first train heading towards Lok Ma Chau today:

	First class	Normal class
Adult ticket	$x + 3y - 1$	$2x + 3$
Concessionary ticket	$6 - 2x + y$	$y - 4$

Find the difference of the number of passengers with adult tickets minus those with concessionary tickets on this train.

45. The following figure shows rectangle $ABCD$ where $AB = (4x + 5y + 6)$ cm and $AD = (12x - 7y + 2)$ cm.



- (a) Find the perimeter of rectangle $ABCD$.
- (b) (i) If $x = 2y$, express the lengths of AB and AD in terms of y .
- (ii) Hence express the perimeter of the rectangle in terms of y .

Build - up Exercise 7F

Fundamental Question

46. Expand the following expressions.

(a) $2(x + 1)$

(b) $3(1 - y)$

(c) $(3x + y)(2)$

(d) $(x - 2y)(3)$

47. Expand the following expressions.

(a) $2x(3y + 1)$

(b) $-x(2 + 4y)$

(c) $(-3 + y)(3x)$

(d) $(-2y - 4)(-2x)$

48. Expand the following expressions.

(a) $a(a^2 - b^2)$

(b) $(2a^2 + 3b)(b)$

(c) $x^2(x + 3)$

(d) $(x - y)(y^2)$

Consolidation Question

49. Expand the following expressions.

(a) $(2x - 7)(3x + 4)$

(b) $(5 - 2x)(3 - 2x)$

(c) $(8y - 8)(9 - 3y)$

(d) $(4y + 9)(y - 3)$

50. Expand the following expressions.

(a) $(x - 7)(3x - 2y)$

(b) $(2x + 3y)(5 + y)$

(c) $(-x - 4)(3y - x)$

(d) $(-4x + 5)(y + x)$

51. Expand the following expressions.

(a) $(-10m^2 - 4m + 8)(9m - 7)$

(c) $(9m^2 - 12m + 11)(7m^2 + 6m)$

(b) $(-12m + 7)(9m - 10m^2 - 12)$

(d) $(2m^2 - m)(7m^2 - 8m + 5)$

52. Expand the following expressions.

(a) $(3x - 2y)(x^2 + xy + y^2)$

(c) $(4x^2 + 9 - 6x)(x + 5y)$

(b) $(x - y)(4x^2 + y - 8)$

(d) $(2xy - x^2 + y)(x - 1)$

53. Simplify the following expressions.

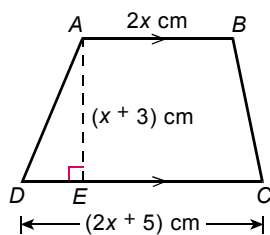
(a) $(x - 2y)(3x + y) + 2x(x - y)$

(b) $[(a - b) - (2a - 3b)](a - b)$



Challenging Question

54. In the figure, $ABCD$ is a trapezium. $AB = 2x$ cm, $CD = (2x + 5)$ cm and $AE = (x + 3)$ cm. Find the area of the trapezium.



55. Marco bought $(2x + 3)$ apples at supermarket A for $\$(3y + 5)$ each, and he bought $(4x + 1)$ pears at supermarket B for $\$(2y + 3)$ each.
- (a) How much did Marco spend on buying apples?
 - (b) How much did Marco spend on buying pears?
 - (c) Find the total amount spent on buying the apples and pears.